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Test 806: International TD-20 (Diesel)

Tractor Museum
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NEBRASKA TRACTOR TEST 806 - INTERNATIONAL TD-20 DIESEL

The University of Nebraska Agricultural Experiment Station

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DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of driv-ers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Fuel Consumption Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION											
Maximum Available Power—Two Hours—2nd Gear											
110.48	20656	2.01	1550	2.64	10.586	0.661	10.44	203	62	81	28.570
75% of Pull at Maximum Power—Ten Hours—2nd Gear											
91.54	16241	2.11	1620	1.88	9.371	0.706	9.77	177	48	51	28.990
50% of Pull at Maximum Power—Two Hours—2nd Gear											
65.69	11356	2.17	1649	1.01	8.030	0.843	8.18	183	59	75	28.690
MAXIMUM POWER											
112.96	28326	1.50	1545	5.46	1st Gear			182	59	72	28.770
115.39	21734	1.99	1545	3.29	2nd Gear			184	59	71	28.860
113.64	17330	2.46	1543	1.99	3rd Gear			194	64	85	28.820
112.34	12453	3.38	1545	1.01	4th Gear			182	54	63	28.860
104.72	8331	4.71	1545	0.71	5th Gear			187	60	71	28.655
89.04	4578	7.29	1544	0.50	6th Gear			190	64	75	28.655

VARYING DRAWBAR PULL AND TRAVEL SPEED—2nd Gear						
Pounds pull	21750	22500	23850	25050	25200	25150	23650
Horsepower	115.4	107.4	101.8	92.2	78.6	67.1	49.2
Miles per hour	1.99	1.79	1.60	1.38	1.17	1.00	0.78

Department of Agricultural Engineering
Dates of Test: October 2 to October 18, 1961
Manufacturer: INTERNATIONAL HARVESTER COMPANY, CHICAGO, ILLINOIS
Manufacturer's Power Rating: 113 Drawbar Horsepower

FUEL, OIL and TIME Fuel No. 2 Diesel **Cetane No** 54 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8283 **Weight per gallon** 6.896 gal **Oil** SAE 30 **API service classification** DS **To motor** 7.819 gal **Drained from motor** 4.936 gal **Transmission and final-drive lubricant** SAE 140 **Type** multi-purpose gear lubricant **Total time engine was operated** 60½ hours.

ENGINE Make International Harvester Diesel **Type** turbocharged 6 cylinder vertical **Serial No.** TD201M-3164 **Crankshaft mounted** lengthwise **Rated rpm** 1550 **Bore and stroke** 4¾" x 6½" **Compression ratio** 15.06 to 1 **Displacement** 691 cu in **Carburetor size** 1¼" (for starting only) **Ignition system** 12 volt battery (for starting only) **Cranking system** 12 volt electric (two 6 volt batteries) **Lubrication** pressure **Air cleaner** dry type with replaceable paper element **Oil filter** 2 replaceable paper elements **Fuel filter** replaceable radial fin paper elements in both auxiliary and final filters **Muffler** not used **Cooling medium temperature control** thermostat.

CHASSIS Type tracklayer **Serial No** TD-201-3226 **Tread width** rear 74" **Wheel base** 94" **Drawbar height** 16" **Measured length of track** 300" **Cleats** integral with shoes **Cleats per track** 40 **Size of cleats** 22" x 2¼" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 49" Vertical distance above roadway 29" Horizontal distance from center of rear wheel tread 0" to the right/left **Cable control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** first 1.6 second 2.1 third 2.5 fourth 3.4 fifth 4.7 sixth 7.3 reverse first 1.9 second 2.5 third 3.0 fourth 4.1 fifth 5.7 sixth 8.8 **Clutch** single plate over center operated by hand lever **Brakes** contracting bands operated by two foot pedals **Steering** two hand levers with hydraulic boosters controlling multiple disc clutches **Turning space diameter** (with brake applied) right 230" left 230" **Power take-off** 1550 rpm at 1550 engine rpm.

TOTAL WEIGHT with Operator 32,485 lb, including crankcase guard 525 lb. transmission guard 110 lb, track roller shield 565 lb, and front cable control unit 504 lb.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 806.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor
Test Engineers

EXPLANATION OF TEST REPORT

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**

International TD-20 Diesel